

## **Exhibit 34**

# **SCHOOL DISTRICT/LOCAL GOVERNMENT ENTITY PLAINTIFFS' OPPOSITION TO DEFENDANTS' MOTION TO EXCLUDE TESTIMONY OF SCHOOL DISTRICT EXPERTS**

Case No.: 4:22-md-03047-YGR

MDL No. 3047

In Re: Social Media Adolescent Addiction/Personal Injury Products Liability Litigation

# Expert Report of Dr. Bryce Ward Charleston County School District

Second Amended



**Confidential - Subject to Protective Order**

September 2, 2025

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## I. SUMMARY

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### A. Executive Summary of Opinions

1. Based on my analysis and review of materials related to this case, I proffer the following opinions at this time to a reasonable degree of economic certainty. Should new information become available I may revise my analysis, my opinions, or both:

- a. Opinion 1: Charleston County School District has incurred past compensatory damages, in the form of lost opportunity costs, from 2017-2018 through 2023-2024 for teachers in the amount of \$37.2M in wages and \$46.4M in wages and benefits (\$2025<sup>1</sup>, valued at the mean reported loss) for time diverted and efforts expended due to student social media use.
- b. Opinion 2: Charleston County School District has incurred past compensatory damages, in the form of lost opportunity costs, from 2017-2018 through 2023-2024 for non-teaching staff, in the amount of \$40.7M in wages and \$47.1M in wages and benefits (\$2025) for time diverted and efforts expended due to student social media use.
- c. Opinion 3: Charleston County School District has incurred past compensatory damages, in the form of lost opportunity costs, from 2017-2018 through 2023-2024 teachers and non-teaching staff for a combined total of between \$77.9M in wages and \$93.5M in wages and benefits (\$2025) for time diverted and efforts expended due to student social media use. A wider range is obtained if one assumes losses at the ends of the confidence interval.

### B. Qualifications

2. I am a founder of ABMJ Consulting (ABMJ), which provides economic and statistical analysis for complex litigation. I have also served as a Senior Research Professor, Visiting Assistant Professor or a Visiting Adjunct Professor at the University of Montana, Lewis and Clark College, the University of Oregon, and Portland State University, where I taught courses in microeconomic theory, statistics and econometrics, public economics, labor economics, and environmental economics. I have testified on economic matters in administrative, legislative, and court proceedings, and I have presented papers at professional proceedings on economics. I received a Ph.D. in economics from Harvard University. Attached as Appendix A is my *curriculum vitae* and table of testimony over the past four years.

3. My work specific to this report and any subsequent testimony is compensated at \$665 per hour. My compensation is not dependent on the outcome of this matter.

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<sup>1</sup> I use “\$2025” to signify that dollar amounts are adjusted for inflation to 2025 using the Personal Consumption Expenditures Price Index.

### C. Information Considered

4. I base my opinions described in this report on my past experience and education as well as on the materials specific to this matter that I reviewed and considered. These materials are detailed in the report text, and are also identified in Appendix B.

## II. BACKGROUND AND ASSIGNMENT

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5. As I understand it, the plaintiffs seek to recover damages sufficient to reimburse them for past harm (compensatory damages), and to defray future costs caused by social media. This report focuses on the first category of harm (past compensatory damages). Specifically, I calculate the amount of money districts expended while teachers, counselors, and/or administrators addressed issues caused by social media in the school environment. As I understand it, a separate expert is charged with calculating future costs, and another expert is charged with calculating other damages incurred to fund mental health programs, social emotional learning programs, and/or technology costs caused by social media.

6. With respect to past damages relating to the diversion of time spent by teachers, counselors, and/or administrators, the plaintiffs claim that they should be reimbursed for time diverted and efforts expended due to the student social media use.<sup>2</sup> In particular, the plaintiffs claim that school staff shifted their time and attention from other matters to deal with the disruptive forces of the defendants' social media platforms and the effects caused in schools, and thus, the plaintiffs claim they should be reimbursed for the cost of the time diverted.

7. The plaintiffs' approach to damages is based on the fundamental economic concept of opportunity cost. When a person allocates a scarce resource—such as money, time, or effort—to a particular use, they forgo the opportunity to use that resource for another potentially

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<sup>2</sup> Order Granting in Part and Denying in Part Defendants' Motion to Dismiss the School District and Local Government Entities' Master Complaint (Oct. 24, 2024), ECF No. 1267 at 19-20 ("The school districts allege injuries that include, but are not limited to, diverting and increasing financial resources to address the disruptive forces of defendants' social media products in school; hiring mental health personnel and developing mental health resources; implementing new information technology and physical resources to limit access to and mitigate risks caused by defendants' platforms; and repairing property damage. These injuries borne by the school districts are related to, but unique from, the alleged injuries of their minor students."); 20-21 ("The social media defendants are alleged to have deliberately fostered compulsive use in minor users, which would foreseeably cause the kind of damage mitigation expenditure incurred by the school districts."); 26 ("[P]laintiffs' core theory of injury suffices to establish proximate cause at the pleading stage: as alleged, defendants' conduct deliberately fostered compulsive use of their platforms which foreseeably caused the plaintiff school districts to respond by expending resources to mitigate the impact of such use in their schools"); 44 ("In sum, defendants' conduct is plausibly alleged to have contributed to negative mental health outcomes for students, causing foreseeable resource expenditures by the school districts to combat that alleged public health crisis"); Order Granting in Part and Denying in Part Defendants' Motion to Dismiss the School District and Local Government Entities' Claims of Public Nuisance (Nov. 15, 2024), ECF No. 1332, at 22-23 ("[D]efendants fail to rebut (i) that the public health is a right common to the public, (ii) and that their conduct as alleged interferes with that common right. While the students' injuries are individualized byproducts of that interference, and while the school districts' resource diversion and expenditure are individualized corollary impacts of those individual students' harms, those harms and costs all flow from defendants' alleged interference with the public health."); 26-27 ("Here, defendants' conduct as alleged has a tendency to affect all youth and the general public, even if the school districts seek remedy solely for consequences that occur to schools, on school grounds, and during school hours").

beneficial purpose. In economic terms, opportunity cost refers to the value of the forgone alternative.

8. A simple example helps to illustrate this concept. Imagine someone dumps garbage on my lawn every week. I dislike having garbage on my lawn, so I spend one hour each week cleaning it up. Since time is limited, I could have spent that hour doing something else. In effect, something I otherwise would have done does not get done. The value of that foregone activity is the opportunity cost of choosing to clean up the garbage. Thus, the primary harm from the trash on my lawn stems from the time I spend removing it, time I could have spent elsewhere.

9. Economists often estimate the opportunity cost of time using the individual's wage. The opportunity cost of an hour spent cleaning my lawn is frequently assumed to equal my hourly wage. While the precise value of the opportunity cost of time is often context dependent, the wage is the common starting point, particularly when work time is at the relevant margin (i.e., the alternative to cleaning up my yard was working for an additional hour).

10. The plaintiffs' damages claims follow this same logic. First, relevant staff time during the school day—such as that of teachers—is finite (e.g., teachers are employed to work a fixed number of hours during the school day per year). Due to the defendants' alleged unlawful conduct, some portion of that time is redirected away from other tasks, creating opportunity costs.

11. Second, the value of this lost time can be measured using employee compensation (i.e., wages) because that is the dollar amount the school districts pay their staff for work during school hours. In other words, the district should be entitled to recover the cost of the time spent responding to the harms caused by the defendants' actions. School districts do not pay different rates for different tasks during the contractually specified work day—a teacher receives the same wage regardless of the specific duties performed. Therefore, valuing the time diverted to social media using the employee's regular salary or compensation rate is reasonable. It is a common practice to use wage rates when valuing lost or diverted time in various economic/education policy and litigation contexts.

12. My analysis of past damages for diversion thus equals the amount of time diverted times the cost of that time (e.g., wages or compensation per hour). Alternatively, one could view damages as the share of time diverted times the total compensation. Mathematically, these approaches are equivalent; however, people may find one more intuitive, so I reference both here.

13. My primary assignment for this report is to calculate the compensation or cost of time for the relevant staff in the district. My assignment also includes multiplying these amounts by the estimated diverted time to produce the estimate for past losses. However, my assignment did not include calculating the time diverted due to the alleged unlawful acts. I relied on a survey of teachers and/or witness declarations for those amounts.

### III. TIME COSTS: WAGES AND BENEFITS PAID TO DISTRICT STAFF

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14. Calculating time costs is conceptually straightforward. Identify the populations covered by the available survey or affidavit-based evidence. Then, sum all amounts paid for work included in the survey or affidavit-based time loss evidence (including benefits costs).

15. First, I identified the people who comprise the population sub-groups included in the survey data or affidavits I received.

16. My first task was to calculate the total amount paid to members of the populations whose time loss was described by Mr. Klein's survey or by witness declarations. Specifically, Mr. Klein's survey measures time lost to social media or its repercussions among middle (grades 6-8) and high school (grades 9-12) teachers. In Charleston, Anita Huggins and Lisa Kathryn Allison provided declarations describing time loss related to social media for the following positions:

- High School Principals
- High School Assistant Principals
- Other high school administrators
- Middle School Principals
- Middle School Assistant Principals
- Other middle school administrators
- School Psychologists
- School Counselors
- School Social Workers<sup>3</sup>

17. To identify the total amounts paid to members of these populations, I relied on data provided to me by Charleston County School District.<sup>4</sup> These data include three components that help me complete this task:

- A variable that describes each employee's job (or position) in the district.<sup>5</sup>
- A variable that describes each employee's location (i.e., their primary worksite or school).<sup>6</sup>

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<sup>3</sup> Aff. of Anita Huggins at ¶¶ 11-14; Aff. of Lisa Kathryn Allison at ¶ 13.

<sup>4</sup> MR\_CCSD\_779237.

<sup>5</sup> JobClassDesc.

<sup>6</sup> LocationDesc.

- Base pay for each employee.<sup>7</sup>

18. I define teachers as anyone whose job description included the term “Teacher;” however, I exclude some people who satisfy this threshold, namely: DNU SUB TEACHER, SAT SCHOOL TEACHER ACADEMIC, STRINGS TEACHER TEMP, SUMMER SCHOOL ACADEMIC TEACHER, TEACHER – TEMPORARY, VIF TEACHER.

19. I define principals and assistant principals as anyone whose job description includes these terms. The affidavit that referenced these positions also referenced other administrators. I was informed that these other administrators included a set of positions identified in two spreadsheets.<sup>8</sup>

20. I define counselors as individuals whose job description include the terms COUNSELOR or GUIDANCE (excluding those whose description includes the term TEMP).

21. Finally, school psychologists and school social workers have descriptions that match their positions.

22. Given that the survey applies to middle and high school teachers, and some positions covered by affidavits also specify different school levels (e.g., middle and high school administrators), I used the JobLocation variable to allocate positions to school levels.

23. I identified the grade span for each school in the data using data from the SC School Report Cards website.<sup>9</sup> For schools including the traditional grade levels (i.e., K-5 for elementary, 6-8 for middle, and 9-12 for high), I assign all positions associated with that school to that level.<sup>10</sup> For sites that span different levels (i.e., K-8), I assume that positions are distributed proportionately to the grades covered (i.e., 1/3 of positions are middle school positions and 2/3 are elementary).<sup>11</sup>

24. Table 1 shows the total pay amounts obtained from the variable BasePay for the listed categories of staff in 2023-2024 (\$2025). The reported totals do not include other pay reported for people included in the specified populations (e.g., overtime or additional pay). The second column adds benefits to the base salary amount based on the benefits multiplier used by the school district (which rose from 30 percent in 2018 to 35 percent in 2024).<sup>12</sup>

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<sup>7</sup> BasePay.

<sup>8</sup> MR\_CCSD\_779238.

<sup>9</sup> SC Report Cards Data Additional Info for 2023-24 obtained from <https://screportcards.com/files/2024//data-files/>.

<sup>10</sup> I also assign all positions to the school level for grade offering that are wholly subsumed by the standard levels (e.g., K-3).

<sup>11</sup> Since the data do not allow for precise identification of the positions at each level, I assign each position a weight for each potential level and then compute weighted sums for the totals by position level. This assumption is appropriate as long as student-teacher (or student-staff) ratios are similar across grade levels, which is generally true. For instance, according to data from the National Center for Education Statistics’s Elementary/Secondary Information System, the student-teacher ratio in Charleston is nearly identical for PK-5 schools, PK-8 schools, and 6-8 schools (13.94 v. 13.85).

<sup>12</sup> Information on benefits multiplier obtained from conversation with CCSD CFO.



**Table 1: Total Base Pay and Base Plus Benefits for Selected Positions in Charleston, 2023-24 (\$2025)**

	<b>Real Base</b>	<b>Real Base + Benefits</b>
Teacher, Elem	100,816,280	127,935,864
Teacher, High	48,583,656	61,652,664
Teacher, Middle	39,118,864	49,641,840
Teacher, Rest of district	14,305,228	18,153,334
Principal, Elem	5,620,854	6,601,693
Principal, High	2,011,122	2,362,063
Principal, Middle	2,039,431	2,395,312
Principal, Rest of district	485,768	570,534
Asst. Principal, Elem	4,876,958	5,727,987
Asst. Principal, High	4,455,649	5,233,160
Asst. Principal, Middle	3,221,574	3,783,739
Asst. Principal, Rest of district	720,872	846,664
Counselor, Elem	3,714,911	4,363,163
Counselor, High	2,963,998	3,481,215
Counselor, Middle	2,778,288	3,263,099
Counselor, Rest of district	5,569,028	6,540,823
Psychologist, Elem	72,746	85,441
Psychologist, High	173,722	204,037
Psychologist, Middle	79,261	93,092
Psychologist, Rest of district	3,584,335	4,209,802
Social Worker, Elem	30,394	35,698
Social Worker, High	61,598	72,347
Social Worker, Middle	30,370	35,670
Social Worker, Rest of district	1,740,678	2,044,427

#### IV. TIME LOST

25. The second question for determining past compensatory damages, in the form of lost opportunity costs, is, “How much or what share of the staff time was ‘lost’ due to student social media use?”

26. Existing studies confirm that, across the nation, public school teachers are losing time to dealing with disruptions from social media in their classrooms.

27. For instance, in one recent report, 88 percent of middle school teachers and 90 percent of high school teachers reported they viewed student social media use as a serious problem, and 58 percent of middle school teachers and 82 percent of high school teachers reported that it was a serious problem in class.<sup>13</sup> Furthermore, among those who reported that social media was a serious problem, 33 percent reported that disruption of instructional time was

<sup>13</sup> <https://www.nea.org/sites/default/files/2024-06/nea-member-polling-on-social-media-personal-devices-and-mental-health-june-20-2024.pdf>.

one of their top three concerns about student social media use. Additionally, 19 percent included the time it took to regulate it as a top three concern.

28. A separate survey found that 72 percent of public high school teachers and 33 percent of public middle school teachers report that students being distracted by their cell phones is a major problem in their classroom.<sup>14</sup>

29. These studies are consistent with the view that—between time spent redirecting off-task students, time spent managing conflicts that began online, time spent enforcing school phone policies, and time spent supporting emotionally affected students—teachers (and likely other school staff) devote time during their day to dealing with student social media use or the repercussion of student social media use.

30. However, these studies do not quantify the amount of time lost. The best evidence outside the context of this litigation that I could find was a dated (2017) survey of teachers in the U.K., which found that the average teacher reported spending over 17 minutes per day to disruptions caused by social media and smart phones.<sup>15</sup> Of course, a survey this old would not take into consideration any changes due to more recent design and marketing efforts made by the defendants, or new platform features. For instance, TikTok only debuted in the United States in 2017, and Instagram Reels debuted in 2020; my understanding from reviewing the complaint in this matter is that both are at issue in the case.<sup>16</sup>

31. In short, while these studies confirm that teachers (and other school district staff) believe that social media is disrupting classrooms, adversely affecting student mental health, and thus creating problems for teachers, they generally do not quantify the time lost to these issues.

32. I was not tasked myself with producing an estimate for diverted time. For that, I have relied on the results of a survey conducted by Mr. Robert Klein and the declarations of Anita Huggins and Lisa Kathryn Allison for this information.

#### A. Survey Data Collected from Teachers

33. Mr. Robert Klein surveyed teachers to determine the amount of instructional time (in minutes) that was diverted to deal with student social media use or the repercussions of student social media use on a typical day during the current school year and various points in the recent past. I have relied on Mr. Klein's expertise in designing and conducting the survey.

<sup>14</sup> [https://www.pewresearch.org/short-reads/2024/06/12/72-percent-of-us-high-school-teachers-say-cellphone-distraction-is-a-major-problem-in-the-classroom/?utm\\_source=chatgpt.com](https://www.pewresearch.org/short-reads/2024/06/12/72-percent-of-us-high-school-teachers-say-cellphone-distraction-is-a-major-problem-in-the-classroom/?utm_source=chatgpt.com).

<sup>15</sup> [https://nominet.uk/news/secondary-school-teachers-losing-11-days-teaching-time-year-due-social-media-smartphone-disruptions/?utm\\_source=chatgpt.com](https://nominet.uk/news/secondary-school-teachers-losing-11-days-teaching-time-year-due-social-media-smartphone-disruptions/?utm_source=chatgpt.com) In this study, the disruptions included: "Almost half (46%) of secondary school teachers have experienced pupils using social media smartphone apps during classes, while four in 10 (40%) have experienced pupils' confidence being damaged by social media issues. Meanwhile over a quarter (27%) have experienced social media cyber bullying in class and 17% have had pupils sharing explicit or pornographic content. Half of teachers (50%) say that social media issues such as these are contributing to their pupils achieving lower grades than they could."

<sup>16</sup> Plaintiffs' First Amended Master Complaint (Local Government and School District) (Mar. 27, 2024), ECF No. 729, at ¶¶ 225, 678-86.

34. Table 2 summarizes the responses to Mr. Klein's survey from Charleston's teachers. It shows the mean number of minutes for each grade-level and period. It also includes the upper and lower bounds for the 95 percent confidence interval around the mean, and the number of observations.

**Table 2: Summary of Klein Survey Results for Charleston Teachers**

Level	Period	Mean	Lower	Upper	N
Middle	2014	12.7	-3.3	28.6	15.0
Middle	Pre-COVID	17.4	4.6	30.2	25.0
Middle	Return	37.1	19.6	54.5	35.0
Middle	Last year	26.7	15.6	37.9	51.0
Middle	Current	21.2	14.3	28.1	102.0
High	2014	13.3	4.3	22.4	18.0
High	Pre-COVID	26.9	14.3	39.5	33.0
High	Return	44.7	31.1	58.4	60.0
High	Last year	42.2	30.6	53.7	78.0
High	Current	13.6	9.8	17.4	131.0

Notes: Calculations of raw Klein survey data. Lower and upper represent the lower and upper ranges of a 95 percent confidence interval calculated using bootstrap standard errors.

35. I assume that Mr. Klein's results for the typical day provide a reasonable approximation of time lost during the average instructional day.

36. In order to compute the monetary opportunity cost, I multiply lost time by wages. I do this by converting Mr. Klein's estimate into the share of a teacher-work year. To do this, I multiply Mr. Klein's average by the number of instructional days.<sup>17</sup> Given that some days are shorter than others (e.g., half-days, early-outs), I adjust the number of days for these shorter days by subtracting the reduced hours from the total and dividing by the number of hours per day.<sup>18</sup>

37. Finally, I divide by the number of contract hours: 1,520 (based on the number of contract days and the number of hours per day).<sup>19</sup>

38. The result of these calculations is the share of work-years lost by teachers, as described in Table 3.

**Table 3: Estimated share of teacher work-years lost by period**

Level	Period	Mean	Lower	Upper
Middle	2014	2%	-1%	6%
Middle	Pre-COVID	3%	1%	6%
Middle	Return	7%	4%	11%
Middle	Last year	5%	3%	7%
Middle	Current	4%	3%	5%

<sup>17</sup> I obtained the number of instructional days from Charleston's academic calendars.

<sup>18</sup> Specifically, the calculation is number of instruction days (180) times 8 hours per day minus early out and half-day (19.25 hours) divided by 8.

<sup>19</sup> Teacher contracts include 190 days and entail a 7.25-hour day.

High	2014	3%	1%	4%
High	Pre-COVID	5%	3%	8%
High	Return	9%	6%	11%
High	Last year	8%	6%	10%
High	Current	3%	2%	3%

Notes: Calculation as described in text. Lower and upper use the upper and lower bounds of the confidence interval to calculate the share.

## B. Declarations Provided by Other Staff

39. Other testimony also includes estimates of time lost to social media or its repercussions for non-teaching staff. Specifically, the affidavits referenced above describe the impact of social media on Charleston's principals, counselors, and various other staff. Table 4 summarizes the estimates from these affidavits for the share of work time spent dealing with social media or its impacts.

**Table 4: Estimated share of work time lost for certain types of staff in Charleston School District**

Period	Job	Share
2017	Principal, Middle	6%
2017	Principal, High	6%
2025	Principal, High	15%
2025	Principal, Middle	10%
2017	Assistant Principal, Middle	6%
2017	Assistant Principal, High	6%
2025	Assistant Principal, Middle	10%
2025	Assistant Principal, High	15%
2017	Counselor	10%
2025	Counselor	45%
2017	Psychologist	10%
2025	Psychologist	45%
2017	Social Worker	10%
2025	Social Worker	45%

Note: When an author reported a range, I used the midpoint. When multiple authors reported a share for the same position, I used the average.

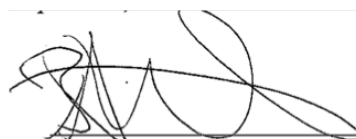
## V. CALCULATION AND CONCLUSION

40. Given the above information, calculating past compensatory damages, in the form of lost opportunity costs, is straightforward. It effectively entails multiplying the total compensation amounts in Table 1 (and similar amounts for years not reported in Table 1) by the share of time lost reported in Tables 3 and 4.

41. Table 5 (below) summarizes the total losses based on this calculation.<sup>20</sup> Charleston School District has incurred past compensatory damages, in the form of lost opportunity costs, from 2017-2018 through 2023-2024, for teachers in the amount of \$37.2M in wages and \$46.4M in wages and benefits (\$2025, valued at the mean reported loss) for time diverted and efforts expended due to student social media use. Additionally, Charleston School District has incurred past compensatory damages, in the form of lost opportunity costs, from 2017-2018 through 2023-2024 for non-teaching staff in the amount of \$40.7M in wages and \$47.1M in wages and benefits (\$2025) for time diverted and efforts expended due to student social media use. In total, Charleston School District has incurred past compensatory damages, in the form of lost opportunity costs, from 2017-2018 through 2023-2024 for teachers and non-teaching staff for a combined total of between \$77.9 in wages and \$93.5M in wages and benefits (\$2025) for time diverted and efforts expended due to student social media use. A wider range is obtained if one assumes losses at the ends of the confidence interval.

42. The undersigned hereby certifies their understanding that they owe a primary and overriding duty of candor and professional integrity to help the Court on matters within their expertise and in all submissions to, or testimony before, the Court. The undersigned further certifies that their report and opinions are not being presented for any improper purpose, such as to harass, cause unnecessary delay, or needlessly increase the cost of litigation.

September 2, 2025



Bryce A. Ward

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<sup>20</sup> Detailed results for each population included are available in the “table 5t” and “table 5a” tabs in the “Charleston tables fix.xlsx” spreadsheet.

**Table 5: Summary of total losses (\$2025)**

<b>Survey</b>	<b>Base Pay</b>			<b>Base Pay + Benefits</b>		
	<b>Mean share</b>	<b>Low</b>	<b>High</b>	<b>Mean share</b>	<b>Low</b>	<b>High</b>
2018	3,214,126	1,171,518	5,256,732	3,927,661	1,431,596	6,423,726
2019	3,655,604	1,483,028	5,828,179	4,501,510	1,826,200	7,176,820
2020	4,119,748	1,828,527	6,410,970	5,111,783	2,268,836	7,954,731
2021	7,483,190	4,722,998	10,243,382	9,285,143	5,860,295	12,709,989
2022	6,638,897	4,259,885	9,017,907	8,299,948	5,325,709	11,274,188
2023	6,053,531	3,991,999	8,115,062	7,625,027	5,028,323	10,221,732
2024	6,027,812	4,085,448	7,970,175	7,649,293	5,184,434	10,114,153
<b>Total</b>	<b>37,192,906</b>	<b>21,543,403</b>	<b>52,842,407</b>	<b>46,400,366</b>	<b>26,925,392</b>	<b>65,875,339</b>

Notes: Calculation described in text. Shares for years not reported in the survey or in the affidavits interpolated linearly.

<b>Affidavits</b>	<b>Base pay</b>			<b>Base pay + benefits</b>		
2018	2,767,633			3,130,193		
2019	3,683,472			4,198,053		
2020	4,566,276			5,243,911		
2021	5,158,033			5,923,485		
2022	6,196,997			7,170,545		
2023	8,443,730			9,843,701		
2024	9,846,014			11,564,143		
<b>Total</b>	<b>40,662,154</b>			<b>47,074,031</b>		
<b>Combined Survey + Affidavit total</b>	<b>\$77,855,061</b>			<b>\$93,474,397</b>		

## APPENDIX A: WARD CV

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### Dr. Bryce Ward

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Ph.D. Economics, Harvard University  
B.A. Economics and History, University of Oregon

Dr. Ward is co-founder of ABMJ Consulting. Previously, he served as a Senior Research Professor/ Associate Director at the Bureau of Business and Economic Research at the University of Montana, as a Research Associate and the University of Montana's Rural Institute and as Senior Economist at ECONorthwest, a Portland, OR based economics consulting firm.

Dr. Ward's areas of expertise include econometric analysis and applied microeconomics -- including urban and regional economics, labor economics, health economics, public finance, and environmental and natural resource economics. Dr. Ward has applied his expertise to a variety of projects involving litigation support and policy analysis. He has provided oral and written testimony in dozens of court, legislative, or administrative proceedings. Dr. Ward has taught courses in microeconomic theory, econometrics, labor economics, public finance, environmental and natural resource economics, and social economics at Harvard University, Lewis and Clark College, the University of Oregon, Portland State University, and the University of Montana.

#### Litigation Support Projects

##### 1. Labor

- Calculated economic damages from lost wages, earnings capacity, etc. and testified in wrongful termination trials. *Various clients – Various locations.*
- Organized data and conducted statistical analysis to evaluate claims of discrimination in employer discrimination lawsuits. *Various confidential clients – Various locations.*
- Provided written and oral testimony on the economics and costs/benefits of union release time. *Martin & Bonnet; Sherman Howard. – Phoenix, AZ*
- Provided written testimony describing the expected impact of a mass layoff on coal miners, their households, and their community (long-term earnings, health, etc.). – *Baker Hostetler – Cleveland, OH*
- Provided testimony and conducted statistical analysis to determine if an observed decline in productivity at the Port of Portland's container terminal reflected union slowdown in response to a labor dispute. *Schwabe Wyatt & Williamson – Portland, OR.*

- Evaluated plaintiff's expert report and helped prepare cross-examination questions in a case involving lost bonus payments and lost profits from the termination and alleged defamation of a financial advisor. *Shepherd Mullin Richter & Hamilton – New York*
- Prepared testimony regarding the comparability of jurisdictions and their compensation schemes in preparation for a public interest arbitration involving sheriff's deputies. *Winterbauer Diamond – Seattle*
- Provided testimony and conducted statistical evaluation of alleged discrimination against African-Americans union workers on a large construction project. *Winterbauer Diamond -- Seattle*
- Provided testimony evaluating plaintiffs' expert report, presenting evidence of failure to mitigate, and calculating damages in a case involving the alleged wrongful termination of 25 Somali immigrants. *K&L Gates -- Seattle*
- Prepared testimony in preparation for a public interest arbitration regarding a timber-dependent county's ability to pay higher compensation to sheriff's deputies in light of potential loss of federal timber payments. *Confidential Client*
- Developed an analytical framework, gathered data, and conducted analyses of current market conditions for workers in comparable jobs and comparable communities as precursor to public-interest arbitrations involving transit districts. *Bullard Smith Jernstadt Wilson – Portland, OR.*
- Described the potential impact of the financial crisis, recession, potential deflation, and other related uncertainty on labor markets and labor negotiations subject to public interest arbitration. *Bullard Smith Jernstadt Wilson – Portland, OR.*
- Testified about the reasons and methods for adjusting wages for changes in the cost of living based on the Consumer Price Index (CPI) and the long-term consequences of not adjusting wages during periods of deflation. *Bullard Smith Jernstadt Wilson – Portland, OR.*
- Summarized economic forecasts for the Portland area, identified potential threats that could cause the economy to deviate from the forecasts, and outlined the implications of the forecast for negotiations between the Portland Police Officers' Association and the City of Portland. *Aitchison & Vick – Portland, OR.*
- Analyzed historical wage and benefit growth for sheriff deputies relative to other public and private sector employees in preparation for labor bargaining. *Bullard Smith Jernstadt Wilson – Portland, OR.*
- Provided written testimony on the effects of proposed increases in piloting fees on local ports and the local economy. *Columbia River Bar Pilots and Haglund Kelly Horngren and Jones – Astoria, OR.*



- Reviewed and conducted analyses in order to determine if specialty forest product harvesters should be considered independent contractors or employees of the “brush picking sheds” that issued their harvester permits. *Talmadge/Fitzpatrick – Washington*.

## 2. Business Damages

- Calculated lost profits associated with alleged failure to pay and subsequent loss of bonding capacity for a construction firm. *Baldwin Law – Bozeman, MT*.
- Calculated lost profits associated with alleged wrongful termination of direct repair program contract termination. *Confidential Client*.
- Evaluated plaintiff’s alleged damages associated with alleged business interruption and reputation damage in a bail bonds business. *The Hustead Law Firm – Denver, CO*
- Provided testimony calculating damages associated with a delayed real estate sale. *Tarlow Stonecipher Weamer & Kelly – Bozeman, MT*
- Provided testimony evaluating plaintiff’s alleged damages in a dispute about a flooded mine tunnel. *Laird Cowley – Missoula, MT*
- Provided testimony evaluating plaintiff’s expert damages and provided alternative estimates in a case involving alleged delay in certification of purebred cattle. *Laird Cowley – Missoula, MT*
- Provided testimony calculating business damages stemming from a former employee shutting down the firms’ internet access. *St. Peter’s Law Offices – Missoula, MT*
- Provided testimony calculating damages associated with a lost real estate development. *Datsopoulos, MacDonald, Lind – Missoula, MT*
- Provided testimony evaluating plaintiff’s damages calculation in a case involving lost profit and lost business value stemming from alleged fraud and breach of a contract. *Garlington Lohn Robinson – Missoula, MT*
- Provided testimony evaluating plaintiff’s expert damages calculation in a case involving lost profit and lost tax advantages from a failed real estate transaction. *Peck, Hadfield, Baxter & Moore – Logan, UT*
- Provided testimony evaluating plaintiff’s expert damages calculation in a case alleging harm from the improper implementation of Montana’s Department of Transportation Disadvantaged Business Entity program. *Montana Department of Transportation, MT*

- Provided testimony about damages from the alleged misappropriation of confidential information, including pricing information. *Wilson Sonsini Goodrich & Rosati – New York, New York*
- Provided written testimony evaluating plaintiff's expert's lost profits analysis in a matter involving alleged substandard performance by a call center. *Arnold Gallagher Percell Roberts & Potter -- Oregon*
- Calculated damages suffered by an auto dealership and service department stemming from the violation of non-solicitation and non-compete clauses in an asset purchase agreement. *Foster Pepper – Oregon.*
- Reviewed plaintiff's expert report and provided questions for deposition and trial for a business damages case involving breeding dogs. *Schedler Bond -- Washington*
- Calculated lost profits to an oyster farm stemming from chemical contamination of their oyster beds. *Confidential client – Pacific Northwest.*
- Analyzed firm losses resulting from former employees' breaches of restrictive employment-contract covenants regarding future employment with a competitor. *Confidential client – Oregon.*

### 3. Anti-Trust & Competition

- Testified regarding the economic aspects of alleged anticompetitive behavior in a market for outpatient diagnostic imaging services in several markets. *Various clients – Various locations.*
- Analyzed the economic issues of class certification and damage calculations related to alleged antitrust violations in the market for residential lots. *Hagens Berman Sobol Shapiro, LLP – Boise, ID.*
- Provided written testimony regarding the presence of competition in a market for private prisons and the likelihood of substantial competitive harm to private prison operators from a Freedom of Information Act (FOIA) request. *Stephen Rahe – Portland, OR.*
- Estimated share of LCD TVs, LCD computer monitors, and notebook computer monitors were purchased by Oregon consumers and state and local governments as part of a price fixing lawsuit. *Oregon Department of Justice – Oregon.*
- Conducted economic analysis on economic damages attributed to alleged antitrust actions in the market for concert-promotion services in the Portland area. *McNamer and Company – Portland, OR*

#### 4. *Environment & Natural Resources*

- Identified and estimated the value of economic costs imposed by an oil spill from a Chevron pipeline. *SWCA Environmental Consultants – Utah.*
- Described the potential economic damages suffered by municipalities in Alabama as a result of the *Deepwater Horizon / BP* oil spill in the Gulf of Mexico. *Cunningham Bounds – Orange Beach, AL.*
- Conducted a rate analysis for a stormwater utility in a large metropolitan area. *Confidential client – Confidential location.*
- Conducted economic analyses on the economic aspects of a breach of contract claim over a reasonable price to provide water to, and process effluent from, a Georgia-Pacific paper mill. *Schwabe Williamson & Wyatt, PC – Hasley, OR.*
- Calculated natural resource damages associated with a Superfund site using a Habitat Equivalency Analysis (HEA). *Quapaw Tribe of Oklahoma – Oklahoma.*
- Described the impact of a change in recreational harvest allocation rules on the economic health and stability of the small businesses that make up the commercial Dungeness crab industry in Puget Sound. *Puget Sound Crabbers Association – Washington.*
- Evaluated the potential economic effects of the U.S. Department of Agriculture and California Department of Food and Agriculture's proposed eradication of the Light Brown Apple Moth. *Earthjustice – California.*
- Calculated profit disgorgement earned while violating California emissions laws. *California Attorney General – California.*
- Evaluated a contingent valuation study of the proposed development of a wind farm. *Perkins Coie – Nantucket, MA.*
- Evaluated the U.S. Environmental Protection Agency's draft report on groundwater and soil remediation scenarios for a creosote-contaminated Superfund site. *Confidential client – Washington.*
- Assisted in an analysis that compared and contrasted benefits and costs, stemming from the use in California of MTBE-oxygenated gasoline with those stemming from the use of ethanol-oxygenated gasoline to determine if refiners could have used ethanol to meet federal reformulated gasoline mandates instead of MTBE during the 1990s. *Various clients – Various locations.*

#### 5. *Right-Of-Way Studies*

- Provided written testimony to the Federal Communications Commission (FCC) that described the results of an original evaluation into the effect of municipal right of

way fees on broadband deployment and adoption using both economic theory and statistical analysis. *Miller Van Eaton – Nationwide*.

- Provided oral and written testimony regarding economic issues related to municipal right-of-way fees in New Orleans. *Goins Aaron and City of New Orleans – New Orleans, LA*.
- Provided written testimony to the Federal Communications Commission (FCC) regarding the economic aspects of allowing local governments to charge telecommunications providers for access to government-owned or managed property. *Miller Van Eaton – Nationwide*.
- Addressed the economic issues of telecommunications firms' challenge, under the Telecommunications Act of 1996, to the City of Portland's franchise-fee agreements for use of the municipal right-of-way. *Miller Van Eaton and City of Portland – Portland, OR*.

## 6. Real Estate

- Calculated economic damages associated with delayed real estate developments. – *Various clients – Various locations*.
- Developed automated valuation models to statistically assess the value several thousand properties in Arizona and Nevada, and provided oral and written testimony on the economic aspects and harm, if any, to plaintiffs, from an alleged scheme that inflated the appraised market value of real estate. *Hagens Berman – Arizona and Nevada*.
- Provided written testimony on the economic aspects and harm, if any, to plaintiffs, from an alleged scheme that inflated mortgage costs without proper disclosure. *Hagens Berman – Arizona*.
- Described the economic costs of a pipeline rupture and related oil spill on residential and public property values. *Salt Lake City – Salt Lake City, UT*.
- Analyzed the impacts of Measure 37 (property rights limitation) on the State of Oregon. *Department of Justice, Office of the Attorney General – Oregon*.
- Prepared testimony regarding the national and Salem, OR real estate markets for a condemnation case. *Garrett, Hemann, and Robertson P.C. – Oregon*.

## 7. Personal Injury & Wrongful Death

- Calculated economic damages in wrongful death lawsuits. *Various clients – Various locations*.
- Calculated lost wages and presented expert testimony in personal injury cases. *Various clients – Various locations*.

- Calculated non-economic damages to a father denied access to his child for 17 years based on expenditures by parents on children. *Jamin Law Group – Alaska.*

#### 8. Other

- Described methodology for evaluating the impact of marketing on opioid use in Canada – *Camp, Fiorente, Matthews, Mogerman – Vancouver, BC*
- Calculated economic damages associated with alleged improper water and wastewater impact fees and discussed the economic incidence of impact fees. *Laird Cowley – Missoula, MT*
- Provided an opinion on the valuation of two convenience stores/ gas station/casinos. *Laird Cowley – Missoula, MT*
- Provided testimony calculating the value of a minority stake in the ammunition manufacturer. *Laird Cowley – Missoula, MT*
- Developed a model to estimate damages suffered by employees as a result of alleged violation of state meal and rest break rules. *Winterbauer Diamond – Seattle, WA*
- Calculated economic damages stemming from an alleged breach of cost and revenue sharing agreements among former law partners. *Laird Cowley – Missoula, MT*
- Provided an opinion regarding the value of a minority stake in manufactured home community. *Reep, Bell, Laird, & Jasper, Missoula, MT.*
- Provided written testimony regarding changes in the market for garbage hauling in Missoula, MT. *Rhoades, Siefert, Erickson – Missoula, MT*
- Prepared a report describing economic and potential non-economic damages for a person who was wrongfully convicted and spent 24 years in jail. *Reep, Bell, Laird, & Jasper, Missoula, MT.*
- Estimated the value of a private real estate brokerage. *Reep, Bell, Laird, & Jasper, Missoula, MT.*
- Prepared written and oral testimony on the value of a minority share of a closely held private corporation. *Reep, Bell, Laird, & Jasper, Missoula, MT.*
- Prepared a report that described the appropriate discount rate to use to compensate a group of developers owed a lump-sum amount for prior investments in the development of local water infrastructure. *Reep, Bell, Laird, & Jasper, Missoula, MT.*
- Evaluated California's methods for validating ballot initiative petitions. *Bell, McAndrews & Hiltachk, Sacramento, CA.*

- Testified in Oregon tax court regarding the extent to which Serenity Lane (a non-profit drug and alcohol treatment center) gives to charity through care scholarships, pricing its services below market rates, offering an intern education program, and performing community education. *Arnold Gallagher Percell Roberts & Potter – Oregon*
- Testified before the Oregon legislature regarding proposed legislation before the Oregon House that amends ORCP 32 by repealing subsection K and, therefore allowing recovery of UTPA statutory damages (currently \$200) in class actions. *Confidential client – Oregon.*
- Calculated reimbursements to families who adopted foster children as part of a class action settlement. *Johnson Johnson Larson and Schaller – Oregon.*
- Evaluated statistical evidence of cheating on a test and testified before administrative review board at a university. *Christie White – Oregon*

## Representative Projects on Other Topics

### 9. Regional Economics

- Provided analysis, presentation, and support for the development of a Community Economic Development Strategy (CEDS). Missoula Economic Partnership – *Missoula, MT*
- Described and evaluated Montana’s bioscience sector – Missoula Economic Partnership – *Missoula, MT*
- Prepared a report describing the state of entrepreneurship in Montana – *Montana Chamber of Commerce – Helena, MT.*
- Analyzed the economic contribution of the Missoula County Fairgrounds to Missoula’s economy – *Missoula County Fairgrounds, Missoula, MT*
- Described the contribution of health care to Billings, MT’s economy. *Big Sky Economic Development Agency – Billings, MT*
- Described trends in key economic indicators (e.g., gross metropolitan product, employment, personal income per capita) in the Portland Area and evaluated them relative to other comparison areas. *Portland Business Alliance – Oregon*
- Defined and described Portland’s traded sector and explained how it contributes to employment growth, income growth, new business formation, and overall regional economic health. *Portland Business Alliance – Oregon*

- Performed a quantitative and qualitative analysis of the economic contributions of Oregon State University's College of Engineering to the regional economy. *Oregon State University College of Engineering – Oregon.*
- Performed a quantitative and qualitative analysis of the economic contributions of The Evergreen State College on the regional and state economies. *The Evergreen State University – Washington.*
- Performed a quantitative and qualitative analysis of the economic contributions of Oregon's Cultural Trust to state economies and assessed the effectiveness of the Oregon Cultural Trust Tax Credit. *Oregon Cultural Advocacy Coalition – Oregon.*
- Conducted data analysis to describe the role of Washington County and Portland's Westside in the regional economy. *City of Hillsboro -- Oregon*
- Conducted data analysis and prepared a report that defined and described Portland's manufacturing and explained how it may contribute to the regional economy by paying higher wages, promoting innovation, and boosting the traded sector. *Portland Business Alliance – Oregon*
- Evaluated the effect of enterprise zone tax incentives on employment growth using a regression-discontinuity analysis of longitudinal establishment-level data. *Oregon Economic Development Association – Oregon*

#### **10. Labor Markets**

- Prepared a report on the "State of the Workforce" in Missoula, MT – *Missoula Economic Partnership*
- Evaluated gender, racial, and age disparities in performance evaluations and promotion decisions at a Fortune 500 company. *Confidential client.*
- Designed survey and prepared article investigating women's low rates of participation in low-stakes "pre-entrepreneurial" activities. *Kauffman Foundation, Kansas City*
- Investigated methods and data for introducing greater flexibility into union contracts. *Association of General Contractors Oregon-Columbia Chapter – Oregon.*
- Described the methods used to calculate hourly billing rates, calculated plausible billing rates for local government employees, and compared these rates to the hourly rates charged by the Lane Council of Governments. *Lane Council of Governments – Eugene, OR.*
- Used IRS tax migration data and the American Community Survey to evaluate the impact of income tax differentials between Oregon and Washington on migration within the Portland-Beaverton-Vancouver, OR-WA MSA. *Association of Oregon Industries – Oregon and Washington.*



- Created a large longitudinal data set of Harvard College students that matched labor market and family outcomes obtained from surveys administered 15-30 years following graduation to undergraduate records. Dr. Ward supervised the creation of the undergraduate database, drafted the survey instrument, managed survey distribution and collection, and conducted preliminary data analysis. *Office of the President, Harvard College – Nationwide.*
- Calculated the potential economic costs associated with proposed change in Oregon’s meal and rest break rule by empirically identifying potentially affected workers and employers, modeling potential employer responses, and identifying values for model parameters. *Michael Lilly Attorney – Oregon.*

### 11. Natural Resources

- Examined the impacts of implementing the King County Wastewater Treatment Division’s Combined Sewer Overflow Control Plan on ratepayers and assessed their financial capacity to bear these impacts. *King County Wastewater Treatment Division – King County, WA.*
- Helped develop an analytical approach to describe the short-term and long-term benefits and costs of clean-up and remediation alternatives for the Portland Harbor Superfund Site. *City of Portland – Portland, OR.*
- Analyzed the effect of Seattle’s Natural Drainage (low impact development) Projects on neighboring property values using a hedonic regression analysis and data from county assessors’ records. *Water Environment Foundation – Seattle, WA.*
- Described the growth in the market for third-party certified forest products and discussed the reasons why firms choose to pursue certification.

### 12. Education

- Helped design a long-term evaluation strategy, including both quantitative and qualitative methods, for the “Dreamer School,” a program designed to promote college attendance for an entire elementary school. *I Have a Dream Foundation – Oregon.*
- Designed and implemented a randomized evaluation that employed longitudinal student and school data to demonstrate the effects of Safe and Civil Schools’ positive behavior support programs on elementary schools in the Fresno Unified School District. *Randy Sprick’s Safe and Civil Schools – Fresno, CA.*
- Evaluated the effectiveness of the South Shore School, a public-private partnership school in Seattle, using a quasi-experimental regression analysis and longitudinal student data. *Seattle Public Schools – Seattle, WA.*
- Evaluated the effectiveness of ASPIRE, a program to increase college enrollment among Oregon high school students, using a regression analysis and longitudinal



student data that matched student K-12 records with college enrollment data. *Oregon Community Foundation – Oregon.*

- Developed a district report card system for several Oregon school districts based on longitudinal student data. *Chalkboard Project – Oregon.*
- Evaluated the effectiveness of Pre-K and K programs in Bremerton, Washington using a regression analysis on longitudinal student data. *Bremerton School District – Bremerton, WA.*
- Testified before Oregon legislature regarding the benefits of using block grants for funding school transportation systems. *Chalkboard Project – Oregon.*
- Developed regression models to calculate funding levels for student transportation in Washington school districts and developed linear programming tools to evaluate the efficiency of district transportation spending. *Washington's Office of the Superintendent of Public Instruction – Washington.*
- Analyzed and presented results of a survey regarding methods for improving efficiency in Oregon schools. *Chalkboard Project – Oregon.*
- Reviewed literature on motivations for and effects of mergers between institutions of higher education. *Confidential client – Various locations.*
- Developed a method for using longitudinal student data to calculate and report student achievement growth (aka a school value-added-model (VAM)) as part of a school accountability program in Seattle, Washington. *Seattle Public Schools – Seattle, WA.*
- Used longitudinal data to describe the Hispanic-White and Black-White achievement gaps in Oregon schools. *Chalkboard Project – Oregon.*
- Described the potential economic effects of eliminating the achievement gaps in Oregon's schools on the state's economy. *Chalkboard Project – Oregon.*
- Reviewed and evaluated current research on the effectiveness of the Safe and Civil Schools program, and worked with clients to develop and implement additional program evaluation. *Randy Sprick's Safe and Civil Schools – Washington.*

### **13. Healthcare**

- Prepared a presentation on COVID's impact on Montana's economy, COVID's impact on health and healthcare in Montana, and long-term issues on health and healthcare in Montana – *Montana Healthcare Foundation*
- Prepared a report that examined the economic impact of Medicaid expansion in Montana – *Montana Healthcare Foundation; Headwaters Foundation*

- Prepared a report describing the fiscal impacts of Medicaid expansion on states' budgets. *Commonwealth Fund – New York, NY.*
- Designed evaluation of Montana's Medicaid Expansion Waiver (HELP Program) – *Montana Department of Public Health and Human Services – Helena, MT*
- Evaluated Montana's Patient Centered Medical Home (PCMH) program – *Montana Commissioner for Securities and Insurance – Helena, MT*
- Evaluated effects of pain, fatigue, and depressed mood on individual participation in daily activities. *University of Montana Rural Institute for Inclusive Communities – Missoula, MT*
- Prepared presentation on drivers and potential solutions to rising health care costs and discussed the impact of high health care costs on large employers. *Blue Cross Blue Shield of Montana – Helena, MT.*
- Prepared report describing characteristics of Montanans who would be eligible for Medicaid if Montana accepted the ACA Medicaid Expansion. *Bureau of Business and Economic Research. Missoula, MT.*
- Prepared report and presentation describing Native American health and health insurance coverage in Montana. *Confidential Client.*
- Reviewed and evaluated current research on the impact of increased hospital supply on local health care markets. *SEIU Local 49 – Portland, OR.*
- Reviewed the literature on the prevalence, preventability, and expense associated with medical injuries and medical errors and used estimates from this literature to describe the potential economic cost to Oregonians caused by medical errors. *Oregon Trial Lawyers Association – Oregon.*
- Produced a primer on health care cost that addressed nine common questions about health care and health care costs. *Regence Blue Cross-Blue Shield of Oregon – Oregon.*
- As part of on-going labor negotiations, provided an independent analysis of a hospital systems financial health based on common financial indicators and health care spending forecasts. *SEIU Local 49 – Oregon.*

#### **14. Public Policy**

- Estimating the potential economic impact of funding cuts to Oregon's courts. *Oregon Trial Lawyers Association – Oregon.*
- Performed a quantitative and qualitative analysis of the economic contributions of Oregon State University on the regional and state economies. *Oregon State University – Oregon.*

- Led a benefit-cost analysis that compared the economic benefits and costs of developing 300 acres of West Hayden Island into a port facility and restoring the remaining 500 acres to leaving all 800 acres in their current state. *City of Portland – Portland, OR.*
- Reviewed the economic literature and described potential impact of proposed income tax increase on taxable income and economic growth. *Oregon Business Council – Oregon.*
- Reviewed the economic literature on the effects of STEM education, conducted data analysis, and produces a simple economic model designed to help educate policy makers about the potential returns to investments in STEM. *Oregon Business Council – Oregon.*
- Developed a model and analyzed data to estimate gross revenues for video, voice, and data services at the city level. *League of Oregon Cities – Oregon.*
- Provided data collection services to determine garbage and yard debris can weights and set-out rates for Eugene residents. *City of Eugene – Eugene, OR.*

#### **15. Real Estate & Land Use**

- Conducted a market analysis for a proposed real estate development in Belgrade, MT – *Confidential Client*
- Estimated the potential economic effects of future residential rural development on real estate values. *San Luis Obispo County – San Luis Obispo County, CA.*
- Analyzed the effect of Portland’s Intertwine (a network of open spaces) on property values in the Portland-Vancouver metropolitan area using a hedonic regression analysis and data from county assessors’ records. *Metro – Portland, OR.*
- With a team of researchers at Harvard University, analyzed the effect of local land-use regulations on housing supply and housing prices for 187 communities in Eastern Massachusetts. *Pioneer Institute for Public Policy Research – Massachusetts.*
- Detailed the sources of housing-price cycles at the neighborhood level. *Pioneer Institute for Public Policy Research – Boston, Massachusetts.*
- Applied the principles of benefit-cost analysis to help Clackamas County understand the full range of economic benefits and costs associated with improving its score on FEMA’s Community Rating System. *University of Oregon – Clackamas County, OR.*
- Worked with emergency managers at the University of Oregon to identify the tradeoffs associated with various hazard mitigation and response plan options, gathered data to evaluate these tradeoffs, and helped calculate the economic benefits and costs associated with different options. *University of Oregon – Eugene, OR.*

## Academic Publications

- "Events Across the Life Course Contribute to Higher Mobility Impairment Rates in Rural US." *Rural Disability and Community Participation*, 16648714, 22. Ipsen, C., Ward, B., & Myers, A. (2022).
- "Effects of an Exercise Intervention on Participation Reported by People with Disabilities: A Mixed Methods Randomized Trial." *Disability and Health Journal*, 101272. Raveslout, C., Myers, A., Santasier, A., & Ward, B. (2022).
- "Effects of a consumer driven home modification intervention on community participation for people with mobility disabilities." *Disability and Health Journal* Greiman, L., Raveslout, C., Goddard, K. S., & Ward, B. (2022).
- "Is the presence of home entrance steps associated with community participation of people with mobility impairments?" *Disability and Health Journal*, 101183. Raveslout, C., Myers, A., Greiman, L., Ward, B., Shinnick, K., & Hall, J. (2021).
- "Effects of a consumer driven home modification intervention on community participation for people with mobility disabilities." *Disability and Health Journal*, 101210. Greiman, L., Raveslout, C., Shinnick-Goddard, K., & Ward, B. (2021).
- "Health status changes with transitory disability over time." *Social Science & Medicine*, 244, 112647 Myers, A., Ward, B., Wong, J., & Raveslout, C. (2020).
- "Transitory and Enduring Disability Among Urban and Rural People." *The Journal of Rural Health*. Sage, R., Ward, B., Myers, A., & Raveslout, C. (2019).
- "Life starts at home: bathing, exertion and participation for people with disabilities." *Archives of Physical Medicine and Rehabilitation* Greiman, L., P. Fleming, B. Ward and C. Raveslout.
- "Disability Items From the Current Population Survey (2008-2015) and Permanent Versus Temporary Disability Status" *American Journal of Public Health*. 2017, Ward, B., A. Meyers, J. Wong, and C. Raveslout.
- "Why Stay Home? Ecological Momentary Assessment of a Community-Based Mixed Impairment Sample" *Disability and Health* 9(2), Raveslout, C, B. Ward, T. Hargrove, J. Wong, N. Livingston, L. Torma, C. Ipsen.
- "Scale-up of Safe & Civil Schools' Model for school-wide positive behavioral interventions and supports." *Psychology in the Schools* 53(4):339-358. Smolkowski, K., Strycker, L., & Ward, B
- "A Randomized Evaluation of the Safe and Civil Schools Model for Positive Behavioral Interventions and Supports at Elementary Schools in a Large Urban School District." *School Psychology Review* 42(3):317-333, Ward B. and R. Gersten. 2013,

"The Causes and Consequences of Land Use Regulation: Evidence from Greater Boston" *Journal of Urban Economics* 65(3): 265-278 Glaeser, E., and B Ward.

"The Effect of Low Impact Development on Property Values." *Proceedings of the Water Environment Federation, Sustainability 2008*, pp. 318-323 Ward, B., E. MacMullan, and S. Reich.

"Myths and Realities of American Political Geography." *Journal of Economic Perspectives*. Glaeser, E., and B. Ward. Spring 2006.

Regulation and the Rise of Housing Prices in Greater Boston. Glaeser, E., J. Schuetz, and B. Ward. Cambridge, MA: Rappaport Institute for Greater Boston, Harvard University, and Pioneer Institute for Public Policy Research. 2006.

"Distance and Social Capital: Can Isolation Be Good?," in *Social Interactions and Economics*, Ph.D Dissertation, Harvard University, March 2006.

"Does Reunion Attendance Affect Alumni Contributions?: Evidence from the Harvard College Classes of 1990-1999," in *Social Interactions and Economics*, Ph.D Dissertation, Harvard University, March 2006.

## Other Publications

The Economic Impact of Homelessness in Missoula: A data-driven report on community impacts and responses. *Missoula Economic Partnership*, March 2024.

Economic Effects of Medicaid Expansion in Montana: 2023 Update, January 2023

"The Future of Montana: What the new wave of in-migration means for the state." *Montana Business Quarterly* (Winter 2022)

"Americans are spending more time alone. Here's why we should reverse that." *Washington Post* (November 23, 2022)

The Economic Effects of Medicaid Expansion in Montana, January 2021

The State of Missoula's Workforce. *Missoula Economic Partnership*.

The Impact of Medicaid Expansion on States' Budgets. *Commonwealth Fund*.

Research and Training Center on Disability in Rural Communities. (April 2020). How will the COVID-19 Recession Impact People with Disabilities in Rural America? Missoula, MT: The University of Montana, Rural Institute for Inclusive Communities.

Ward, B., C. Ipsen, L. Greiman, and L. Smith (2019). *ACA and Medicaid Expansion Associated with Increased Insurance Coverage for Rural Americans with Disabilities*.

*The Economic Impact of Medicaid Expansion in Montana: Updated findings*, January 2019.

"Rural people with disabilities are still struggling to recover from the recession." *The Conversation* Greiman, L. A. Myers, B. Ward, and C. Ipsen. January 2019.

*The State of Entrepreneurship in Montana*, August 2018.

*The Economic Impact of Medicaid Expansion in Montana*, April 2018.

"Tackling Montana's Workforce Shortage: If you want answers, talk with workers." *Montana Business Quarterly*, Spring 2018.

"Poverty With a View" *Montana Business Quarterly*, Winter 2018.

"Affordable Housing in Montana: Are We Pricing Out Our Residents?" *2018 Montana Economic Report*.

"Health Care: Recent Trends in Health Care Spending." *2018 Montana Economic Report*.

"Barriers to Women's Entrepreneurship" *Montana Business Quarterly*, Summer 2017.

"The High Wage Jobs Puzzle: Finding Montana's Place in the New Geography of Jobs." *2017 Montana Economic Report*.

"Health Care: More Change and Uncertainty" *2017 Montana Economic Report*.

"Building Missoula's Entrepreneurial Ecosystem" *Missoulian* January 29, 2017.

"Picking the Right College" *Montana Business Quarterly*, January 2017.

"The Curse of the College Town" *Montana Business Quarterly*, September 2016.

"Higher Education: Explaining the Outmigration of Montana's College-Educated Workers" *Montana Economic Report* 2016.

"Expanding Medicaid in Montana: What do the experiences of other states tell us?" *Montana Economic Report* 2016.

"Health Care: Spending hits a speed bump" *Montana Economic Report* 2016.

"Who might get Medicaid if Montana expands eligibility." BBER Issue Brief 2015.

"Health Care: A system in transition." BBER 2015 Outlook Briefing Book.

"Future Needs a Sound Foundation." *The Register-Guard*. Ward, B., E. Whitelaw, and P. Taylor. March 17, 2013.

"Bend's True Economic Picture May Surprise You." *The Bulletin*. Ward, B., E. Whitelaw, and P. Taylor. February 21, 2013

"Oregon education reform: Clues to the success of overachieving schools lie in the data" *Oregonian*. Tapogna, J, A. Dyke, and B. Ward. August 11, 2012.

"Economic Bridges Falling Down." *Eugene Weekly*. Ward, B. and E. Whitelaw. October 8, 2008.

"The Economy: Now What? The Economists: Ward and Whitelaw" *Oregonian*, Ward B. and E. Whitelaw. September 20, 2008.

"Dream On." *Oregon Quarterly*. Ward, B. and E. Whitelaw. Winter 2007.

"Still the Land of Opportunity?" *Oregonian*. Tapogna, T., B. Ward, and E. Whitelaw. March 2006.

"The Price Is (Not) Right." *Commonwealth: Growth and Development Extra*. Glaeser, E., J. Schuetz, and B. Ward. January 2006.

## **Presentations**

"Homelessness in Missoula" Missoula Economic Partnership Fast Action Forum, February 2024.

"The economic effects of Medicaid expansion in Montana: A review" Presentation to Montana State Legislature MARA Committee, January 2024.

"The Future of Montana." University of Montana Bureau of Business and Economic Research 2023 Economic Outlook Seminar. January-February 2023.

"Montana's Economy: What's going on and how do we do better?" Montana University System. December 2022.

"Missoula's economic challenges: Looking back and looking forward" Missoula Economic Partnership Annual Meeting, October 2022

"Getting to Happily Ever After in Small Business Valuation." Montana Tax Institute. October 2022.

"Montana's Economy: The post-COVID rollercoaster." State Bar of Montana Annual Bankruptcy Seminar. July 2022.

"Defining the issue: Workforce." Big Sky Business Innovation Summit. May 2022.

"Why is it so hard to hire? Where are all the workers?" Glacier Country Tourism Summit, November 2021.

"The simple story of the COVID economy." State Bar of Montana Annual Bankruptcy Seminar, August 2021.



“Racial and ethnic inequity: Understanding and addressing local government’s contribution.” University of Montana Public Service Academy, August 2021.

“The economy is going crazy!!! What’s going on?” Missoula Gives, May 2021.

“Missoula’s economy: What’s going on and how can we do better?” Missoula Economic Partnership, December 2020.

“How to grow a bioscience cluster.” Big Sky Business Innovation Summit, October 2020.

“The COVID economy: Where are we now, and where might we be headed?” State Bar of Montana Annual Bankruptcy Seminar, August 2020.

“Potential impacts of the coronavirus on the economy.” Missoula Marketwatch, March 2020.

“The Economics of Injury, Pain, and Opiate Addiction in Montana.” Governor’s Conference on Workers’ Compensation, August 2019.

“Montana’s Economy: What’s going on and how can we do better?” State Bar of Montana Annual Bankruptcy Seminar, August 2019.

“The Economics of Addiction in Montana” Montana Opioid & Addictions Summit, October 2018.

“The economic impact of Medicaid expansion in Montana.” State Chamber of Oklahoma Health Care Summit, October 2018.

“The State of Entrepreneurship in Montana.” Montana Chamber of Commerce 2018 Economic Update Series, August 2018.

“Better off in Billings – Data for talent attraction” Billings’ Workforce Council Annual Meeting, April 2018.

“Healthcare in Montana: Can consumer centrism move us closer to the ideal?” *Healthcare at a Crossroads*, Healthcare policy conference, Montana State University, April 2018.

“An economist’s perspective on pulmonary health.” *Big Sky Pulmonary Conference*, March 2018.

“Is single-payer the solution (or part of the solution) to our healthcare problems?” Missoula League of Women Voters Forum, March 2018.

“The Future of Higher Education” Bureau of Business and Economic Research 2017 Economic Outlook Seminar Tour (Jan-Mar 2018)



"Ugh! This is awful!: The economic consequences of wildfire smoke." State of Missoula, January 2018.

"The Contribution of Health Care to Montana's Economy" Montana Tax Payer Association Annual Conference, December 2017.

"Missoula's economy: What's going on and how can we do better?" Leadership Missoula, November 2017.

"Understanding and mitigating the economic costs of cancer." Montana Cancer Action Network Policy Conference, Keynote Address, November 2017.

"Montana's economy: What's going on and how can we do better?" Missoula Federal Credit Union Board Retreat, October 2017.

"How to build a regional economy: the role for talent attraction." Montana Economic Developers Association Fall Conference, October 2017.

"The significance of health care to Western States' economies" Western States Association of Tax Administrators Conference, October 2017.

"A health economist's view of the world and Mountain Pacific Quality Health's role in it." Mountain Pacific Quality Health Foundation Board Meeting, August 2017.

"Building Montana's Health Care Workforce: The role of talent attraction." Innovate Montana Symposium, July 2017.

"Meet Me in Montana: Developing Talent Attraction Tools for Montana" BillingsWorks, April 2017.

"The High Wage Jobs Puzzle: Finding Montana's Place in the New Geography of Jobs" Keynote Address: Bureau of Business and Economic Research 2017 Economic Outlook Seminar Tour; Montana Society of CPAs Industry Conference, Jan - Mar 2017.

"The Contribution of Health Care to Montana's Economy" Bureau of Business and Economic Research 2017 Economic Outlook Seminar Tour (Jan-Mar 2017)

"Life Starts at Home: Linking Home Environment and Quality of Life for People with Disabilities." Affordable and Accessible Housing for Vulnerable Older Adults and People with Disabilities Living in the Community: A Workshop, National Academies of Science, Engineering, and Medicine, 12/2016.

"Missoula's Economy: A Framework" Missoula Economic Partnership, 10/2016; Missoula City Council Committee of the Whole 12/2016.

"The Contribution of Health Care to Flathead County (MT)'s Economy." Kalispell Chamber of Commerce, 8/2016

"Time Use at Home and in the Community." National Association for Rehabilitation Research and Training Centers Annual Conference, 5/2016

"Housing Characteristics, Home Experiences, and Community Engagement of People Who Report Impairment." RTC: Rural State of the Science webinar, 6/2016.

"Finding Missoula's Place in the New Geography of Jobs." Missoula Rotary Club, 6/2016.

"Employment Outcomes for Montana University System Graduation: Evidence from Administrative Data." University of Montana School of Business Administration, 10/2015.

"Moving beyond time and money: The effect of effort scarcity on individual choices." University of Montana, Department of Economics Seminar, 11/2015.

"Understanding and Increasing Women's Participation in Pre-Entrepreneurial Activities" University of Montana School of Business Administration. 4/2016

"Health Care in Montana: The next 10 years" 2016 BBER Economic Outlook.

"Economic Impact of the Western Montana Family Residency" Western Montana Family Medical Residency Board Meeting, 10/2015

"Revisiting the Economic Impacts of Medicaid Expansion" Association of University Business and Economic Research (AUBER) Fall Conference, 10/2015

"The Future of Health Care Costs – Impacts on your business" – Blue Cross Blue Shield of Montana Employer Summit (Keynote) 8/2015.

"Eight Questions about Health Economics" Healthcare Financial Managers Association (Keynote) 4/2015.

"Healthcare Headlines: Changing Access, Managing Costs, Improving Quality." 2015 BBER Economic Outlook.

"Recent trends in the microeconomics of family medicine practices." Didactic presentation to Family Medicine Residency of Western Montana 1/2015.

"The economics of Medicaid Expansion in Montana." Montana Health Care Forum. 12/2014

"A Primer on Health Care Costs: Brief answers to nine important questions." Didactic presentation to Family Medicine Residency of Western Montana 11/2014

"The contribution of health care to Billings' Economy: Final Report." Big Sky Business Healthcare Summit 11/2014

"The Culture of Non-Work?: Quality of Life and the College Educated Workforce in Oregon." Association of University Business and Economic Research (AUBER) Fall Conference, 10/2014.

"Health and Health Care in Montana." Montana Healthcare Foundation Board of Trustees 8/2014

"The economic impact of health care on Billings' economy" Big Sky Business Healthcare Summit 7/2014

"The contribution of health care to Billings' economy." Big Sky Business Healthcare Summit 7/2014

"The contribution of health related industries to Billings' economy." Big Sky Business Healthcare Summit 7/2014

"The future of healthcare in Billings." Big Sky Business Healthcare Summit 7/2014

"Economic Contribution of Health Care to Rural Economies." Northern Rockies Health Care Innovation Summit, Fairmount, MT, June 10, 2014

"Assessing the Health of the Missoula Economy." National Association of Insurance and Financial Advisors, Missoula, 5/2014.

"Your Voice, Your Vote: Debt-ceiling deadline." KATU News. October 2013.

"Jobs and Economy Forum." Oregon Summit. October 2013.

"Oregon's Economy: Mixed Symptoms" Testimony before Oregon House Committee on Transportation and Economic Development. February 2013.

"Polka Dots and Stripes: Mismatch Between Supply and Demand in a Changed Economy." Housing Land Advocates Conference. Portland, Oregon. September 14, 2012.

"Eugene-Springfield's economy" Eugene City Club. Eugene, OR. July 13, 2012.

"Economic Growth, Natural Capital, and Sustainability." CLE presentation. Portland, Oregon. April 11, 2012.

"Benefits and Costs of Seismic Mitigation." January 19, 2011. CREW Benefit-Cost Analysis Forum. Eugene, Oregon.

"Does Low-Impact Development Affect Property Values?: Evidence from Seattle's Natural Drainage System Projects." Water Environment Foundation Sustainability 2008 Conference. June 2008.

"Compensation for ROW Access Under the Telecommunications Act of 1996: Fiscal Issues Related to Communications Services." NATOA 27<sup>th</sup> Annual Conference.

Sponsored by the National Association of Telecommunications Officers and Advisors. Portland, Oregon. October 2007.

“Outside the Light: The real factors driving Eugene/Springfield's Economy.” Eugene-Springfield Leadership Program. Sponsored by the Eugene Area Chamber of Commerce. Eugene, Oregon. October 2006.

“Deregulating the Housing Market.” Preserving the American Dream Conference. Sponsored by the American Dream Coalition. Atlanta, Georgia. September 2006.

## **Teaching**

Instructor, University of Montana; Course: Social Networks and Social Skills, Spring 2020.

Visiting Adjunct Instructor, Portland State University; Courses: Global Environmental Economics, Spring 2010.

Visiting Assistant Professor, Lewis and Clark College; Courses: Intermediate Microeconomic Theory, Econometrics, Public Economics, Environmental and Natural Resource Economics, Spring 2008 & Fall 2009.

Visiting Adjunct Instructor, University of Oregon; Courses: Labor Economics, Spring 2009.

Tutorial Leader, Harvard College; Courses: Everybody's Doin' It: Social Interactions and Economics, 2002-2006, Senior Thesis Tutorial: Labor, 2004-05.

Teaching Fellow, Harvard University; Courses: Intermediate Microeconomic Theory, Intermediate Macroeconomic Theory, Microeconomics: A Policy Tool for Educators, 2001-2003.

Teaching Assistant, University of Oregon; Courses: Principals of Microeconomics, Urban Economics, Economy of the Pacific Northwest, 1998-1999.

## **Memberships**

- Maureen and Mike Mansfield Center, Advisory Board, 2021-Present.
- Mountain-Pacific Quality Health Foundation, Board of Directors, 2014-2020
- Oregon Seismic Safety Policy Advisory Commission (OSSPAC), 2012-2013.

**Appendix B****Materials Considered****Charleston Documents**

<b>Bates</b>
MR_CCSD_265625
MR_CCSD_265796
MR_CCSD_265960
MR_CCSD_266131
MR_CCSD_266311
MR_CCSD_266490
MR_CCSD_266815
MR_CCSD_779237
MR_CCSD_779238
JobClassDescription
LocationCodeDescription

**Articles and Studies**

<a href="https://www.nea.org/sites/default/files/2024-06/nea-member-polling-on-social-media-personal-devices-and-mental-health-june-20-2024.pdf">https://www.nea.org/sites/default/files/2024-06/nea-member-polling-on-social-media-personal-devices-and-mental-health-june-20-2024.pdf</a> .
<a href="https://www.pewresearch.org/short-reads/2024/06/12/72-percent-of-us-high-school-teachers-say-cellphone-distraction-is-a-major-problem-in-the-classroom/?utm_source=chatgpt.com">https://www.pewresearch.org/short-reads/2024/06/12/72-percent-of-us-high-school-teachers-say-cellphone-distraction-is-a-major-problem-in-the-classroom/?utm_source=chatgpt.com</a> .
<a href="https://nominet.uk/news/secondary-school-teachers-losing-11-days-teaching-time-year-due-social-media-smartphone-disruptions/?utm_source=chatgpt.com">https://nominet.uk/news/secondary-school-teachers-losing-11-days-teaching-time-year-due-social-media-smartphone-disruptions/?utm_source=chatgpt.com</a>
<a href="https://nces.ed.gov/ccd/files.asp">https://nces.ed.gov/ccd/files.asp</a>
<a href="https://nces.ed.gov/ccd/elsi/tableGenerator.aspx">https://nces.ed.gov/ccd/elsi/tableGenerator.aspx</a>
SC Report Cards Data Additional Info for 2023-24 obtained from <a href="https://screportcards.com/files/2024//data-files/">https://screportcards.com/files/2024//data-files/</a>

**Litigation Documents**

Master Complaint (Redacted) (Local Government and School District), March 27, 2024 In Re: Social Media Adolescent Addiction/Personal Injury Products Liability Litigation (MDL 3047)
Defendants' Motion to Dismiss the School District and Local Government Entities' Master Complaint, February 5, 2024 In Re: Social Media Adolescent Addiction/Personal Injury Products Liability Litigation (MDL 3047)
Plaintiffs' Opposition to Defendants' Motion to Dismiss the School District and Local Government Entities' Master Complaint, March 4, 2024 In Re: Social Media Adolescent Addiction/Personal Injury Products Liability Litigation (MDL 3047)

Defendants' Reply ISO Motion to Dismiss the School District and Local Government Entities' Master Complaint, March 25, 2024 In Re: Social Media Adolescent Addiction/Personal Injury Products Liability Litigation (MDL 3047)
Order Granting in Part and Denying in Part Defendants Motion to Dismiss the School District and Local Government Master Complaint, October 24, 2024 In Re: Social Media Adolescent Addiction/Personal Injury Products Liability Litigation (MDL 3047)
Order Granting in Part and Denying in Part Defendants Motion to Dismiss the School District and Local Government Entities' Claims of Public Nuisance, November 15, 2024 In Re: Social Media Adolescent Addiction/Personal Injury Products Liability Litigation (MDL 3047)
2024-08-22 SD BW Pls.' Amended Rule 26 Initial Disclosures
2025-04-23 Charleston County's Third Suppl. Rule 26 Initial Disclosures
2024-05-24 Charleston County - Amended Plaintiff Fact Sheet
2024-07-17 Charleston County - Amended Supplemental Plaintiff Fact Sheet
2025-02-04 Charleston County - SHAPE Profile
2025-05-10 Charleston County - Third Amended Plaintiff Fact Sheet
2025-05-12 Charleston County - Affidavit of Anita Huggins
2025-05-15 Charleston County - Affidavit of Lisa Allison
2025.05.18 Expert Report of Robert L. Klein

**Other Expert Documents:**

Final Data Analysis 5.12.25
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